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April 25, 1996

Mr. William F. Caton  
Office of the Secretary  
Federal Communications Commission  
1919 M Street, NW  
Washington, DC 20554

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Re: In the Matter of Amendment of Parts 74, 78, and 101 of the Commissions Rules to Adopt  
More Flexible Standards for Directional Microwave Antennas

Dear Secretary Caton,

Enclosed herewith is one (1) original, and five (5) copies of our comments in response to ET  
Docket No. 96-35.

Sincerely,

COMSEARCH

Peter S. Young  
Engineer  
Microwave and Satellite Services

Enclosures

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**Before the  
Federal Communications Commission  
Washington, DC 20554**

**In the Matter of**

**Amendment of Parts 74, 78, and 101  
of the Commission's Rules to Adopt More  
Flexible Standards for Directional  
Microwave Antennas**

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**ET Docket No. 96-35**

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**COMMENTS OF COMSEARCH  
ON THE  
NOTICE OF PROPOSED RULE MAKING**

Comsearch respectfully submits its comments in response to the Commission's Notice of Proposed Rule Making (NPRM) in ET Docket 96-35. In this NPRM, the Commission proposes to revise Parts 74, 78 and 101 of its Rules to make them more compatible with certain new, emerging technologies for directional antennas. The proposal permits alternative showings that directional antennas comply with maximum beamwidth requirements instead of minimum gain requirements. The NPRM seeks comments on the proposed revision, and its impact on the frequency coordination process.

Comsearch is an independent firm with nineteen years experience in spectrum management of terrestrial microwave, satellite, and mobile telecommunications systems. We provide engineering services to a variety of spectrum users including those regulated by Parts 74, 78 and 101 of the Rules.

### **Antenna Compliance With Maximum Beamwidth Instead Of Minimum Gain**

The use of directional antennas in the frequency coordination process allows a high degree of frequency reuse and spectrum efficiency in the fixed point-to-point microwave services. Such spectrum efficiency depends upon antenna radiation pattern performance (beamwidth, sidelobe suppression, and front-to-back ratio), not upon antenna gain. We therefore concur with the Commission that there is no need for a minimum antenna gain requirement as long as the maximum beamwidth and minimum radiation suppression requirements are met.<sup>1</sup>

### **Impact On Frequency Coordination**

In Paragraph 8 of the NPRM, the Commission requests comment on whether differences in the shape of the mainlobe for new types of antennas, such as planar arrays, will have an impact on frequency coordination and whether coordinators should treat these new antennas “as if they had the mainlobe shape and total gain of a conventional parabolic dish antenna.”<sup>2</sup> In practice, frequency coordinators perform interference calculations using actual antenna radiation pattern envelopes (RPEs) provided by the manufacturers. The Commission requires the radiation pattern information to be a part of frequency coordination and license application in Parts 101.103(d) and 101.21(d), respectively. The idea that coordinators should make assumptions about antenna performance rather than using the published radiation patterns appears to us to be in conflict with the intent of 101.21 and 101.103.

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<sup>1</sup> NPRM, at paragraph 6.

<sup>2</sup> NPRM, at paragraph 8.

Using actual antenna radiation pattern data in frequency coordination maximizes spectrum efficiency by taking advantage of antenna performance exceeding artificial standards such as those described by Sections 74.536, 74.641, 78.105, and 101.115. The Commission should not promote the use of any assumptions, worst case or otherwise, about antenna performance but instead should maintain the existing requirements that manufacturer certified antenna radiation patterns be used for frequency coordination. With this procedure, any differences in the shape of the mainlobe of the new antennas versus that of conventional antennas will be properly taken into account in interference calculations.

For planar arrays, it is possible to electrically “steer” the main beam of the antenna, and manufacturers may intend to make use of this feature in their designs. The fact that each installation may therefore have a unique radiation pattern presents new problems in the coordination process. Despite the increased data requirements that could result, we believe that proper frequency management can take place as long as manufacturers continue to provide guaranteed or certified radiation patterns for use in interference analysis. Ideally, the radiation pattern data should be measured since actual performance can differ significantly from theoretical performance and, as far as we are aware, it is not possible to derive cross-polarized antenna performance theoretically. Accurate interference analysis and therefore efficient use of the spectrum depend on the availability of both co-polarized and cross-polarized antenna patterns.

Comsearch supports the use of new technologies in the terrestrial microwave services, and the rule changes specified in the NPRM. The Commission should emphasize that in order for coordinators

and applicants to fulfill the requirements of Parts 101.21(d) and 101.103(d), radiation patterns must be published for all directional antennas. This would serve the public interest by promoting spectrum efficiency while allowing the use of new antenna technologies.

Respectfully Submitted,  
COMSEARCH

Prepared By: *Ben Dorn for*  
Peter S. Young

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